

CLAIMS

What is claimed is:

1. A method facilitating remote deployment of network devices, comprising
monitoring, at a network device operating in an unconfigured mode, for a configuration message, wherein the configuration message includes information sufficient for the network device to establish a network connection with a remote device;
configuring the network device using the configuration information in the configuration message; and
switching the network device to a configured mode.
2. The method of claim 1 further comprising
transmitting a message to the remote device.
3. The method of claim 1 wherein the network device is disposed on a communications path between a first network and a second network; and wherein the method further comprises
forwarding all packets, other than configuration messages, along the communications path.
4. The method of claim 2 wherein the transmitting step comprises
initiating a connection to the remote device.
5. The method of claim 1 further comprising
receiving additional configuration from the remote device.
6. The method of claim 1 wherein the remote device is a network management system.

7. The method of claim 1 further comprising
validating the configuration message before the configuring step.
8. The method of claim 3 wherein the configuration message is transmitted from a remote device on the first network and addressed to a destination host on the second network.
9. A method facilitating remote deployment and configuration of a network device physically installed on a first network, wherein the network device is operative to intercept configuration messages, comprising
composing a configuration message including configuration information corresponding to a network device; and
transmitting from a second network a configuration message to a destination host in the first network, wherein the network device is disposed on the communications path between the second network and the destination host.
10. The method of claim 9 further comprising
repeating the transmitting step until a response to the configuration message is received from the network device.
11. The method of claim 9 wherein the configuration information comprises information sufficient for the network device to establish a network connection with a remote device.
12. The method of claim 9 wherein the configuration message includes configuration information including a network address for the network device, a sub-network mask for the first network, a network address for the remote device, and the network address of the gateway router corresponding to the first network.

13. The method of claim 11 wherein the configuration information further includes a cryptographic digest of the configuration information.
14. The method of claim 13 wherein the configuration information is encrypted with an encryption key.
15. The method of claim 14 wherein the encryption key comprises a secret string of text.
16. The method of claim 15 wherein the encryption key further comprises a random number.
17. The method of claim 16 wherein the encryption key further comprises the network address of the destination host.
18. The method of claim 15 wherein the network device is pre-configured with the secret string of text.
19. The method of claim 14 wherein the encryption key is a symmetric encryption key.
20. The method of claim 14 wherein the encryption key is a private encryption key, and wherein the configuration information is encrypted using an asymmetric encryption algorithm.
21. The method of claim 20 wherein the network device is preconfigured with the public encryption key corresponding to the private encryption key.
22. The method of claim 19 wherein the symmetric encryption key is encrypted using an asymmetric encryption algorithm with a private encryption key.

23. The method of claim 22 wherein the network device is preconfigured with the public encryption key corresponding to the private encryption key.

24. A method facilitating remote deployment of network devices, comprising
monitoring, at a network device in an unconfigured mode, for a configuration message transmitted by a network management system, wherein the configuration message includes configuration information for the network device;

after detection of a configuration message, validating the configuration message;

if the configuration message is valid, configuring the network device using the configuration information in the configuration message.

25. The method of claim 24 wherein the configuration message includes information sufficient for the network device to establish a network connection to network management device.

26. The method of claim 24 further comprising
forwarding on all packets other than configuration messages.

27. The method of claim 24 further comprising
forwarding on configuration messages that are not valid relative to the network device.

28. The method of claim 24 wherein the configuration information comprises a network address for the network device, and a network address corresponding to the network management system.

29. The method of claim 24 wherein the configuration information in the configuration message is encrypted.

30. The method of claim 24 wherein the network device is operably connected to a first network comprising a gateway router having a gateway network address; wherein the configuration information in the configuration message comprises the network address of a gateway router; and wherein the validating step comprises determining whether the network address of the gateway router matches the gateway network address of the gateway router.

31. The method of claim 24 wherein the determining step comprises broadcasting an address resolution protocol request, including the network address in the configuration message, on the network.

32. The method of claim 24 wherein the monitoring step comprises
intercepting, at a first network interface, a configuration message transmitted by a network management system;
passing other packets to a second network interface for forwarding along a communications path.

33. The method of claim 24 wherein the configuration information in the configuration message is encrypted and wherein the validating step comprises decrypting the configuration information.

34. A method facilitating remote deployment of network devices, comprising
intercepting, at a network device in an unconfigured state, a configuration message transmitted by a network management system, wherein the configuration message includes configuration information for the network device;
after detection of a configuration message, validating the configuration message;
if the configuration message is valid, configuring the network device using the configuration information in the configuration message.

35. The method of claim 34 wherein the configuration information includes the network address of a network management system, and wherein the method further comprises

establishing a connection to the network management system using the network address in the configuration information.

36. A network device allowing for automated, remote deployment, comprising at least one network interface operative to transmit and receive packets over a computer network;

a configuration interface module operative to configure the network device based on received configuration information; and

a configuration daemon operative, when the network device is an unconfigured state, to

monitor the at least one network interface for configuration messages; validate configuration messages; and

invoke the configuration interface module after receipt of a valid configuration message.

37. The network device of claim 36 comprising first and second network interfaces operative to transmit and receive packets over a computer network; and wherein the configuration daemon is further operative to

forward packets, intended for other network devices, received at the first network interface for transmission from the second network interface; and

forward packets, intended for other network devices, received at the second network interface for transmission from the first network interface.

38. The network device of claim 36 wherein the configuration interface module is operative to configure the network device to communicate with a remote network device using information in the configuration message.

39. A network device facilitating remote deployment and configuration, comprising
a configuration daemon operative, in an unconfigured mode, to
monitor for configuration messages including configuration information,
sufficient to configure the network device to communicate with a remote device over
a computer network; and
a configuration interface module operative to
initially configure the network device to communicate with a remote
device over a computer network based on configuration information in a
configuration message received by the configuration daemon; and
communicate with the remote device to receive additional
configuration information.

40. The network device of claim 39 further comprising
at least one network interface operative to transmit and receive packets over
a computer network; and wherein the configuration daemon is operative to monitor
for configuration messages received at the at least one network interface.

41. In a network environment comprising a first network and a second network,
wherein the first network includes a gateway router allowing access to resources on
at least the second network, a method facilitating remote configuration of a network
device physically installed on the first network, the method comprising

identifying a destination host on the first network, wherein an unconfigured
network device is disposed on the communications path between the gateway router
and the network device, wherein the network device is operative, in an unconfigured
mode, to intercept configuration messages;

transmitting a configuration message to the first network, wherein the
configuration message is addressed to the destination host.

t1. The method of claim 41 wherein the configuration message is formatted in a manner that causes the destination host to ignore the configuration message.

t2. The method of claim 41 wherein the configuration message is formatted in a manner that causes the destination host to discard the configuration message.

t3. The method of claim 41 wherein the configuration message is formatted according to a protocol that is not implemented by the destination host.

t4. The method of claim 41 wherein the configuration message is formatted according to a protocol that is not understood by the destination host.

t5. The method of claim 41 wherein the configuration message includes information sufficient for the network device to establish a network connection with a remote device.

t47. The method of claim 46 wherein the configuration message includes a network address for the network device, a sub-network mask for the first network, a network address for the remote device, and the network address of the gateway router.

48. A method facilitating remote, automated deployment of a network device on a network, comprising

 establishing, in an unconfigured mode, a connection with a remote device for configuration information;

 providing, during the connection, a hardware profile of a network device;

 receiving configuration information from the remote device based on the hardware profile.

49. The method of claim 48 further comprising

 obtaining a network address before the establishing step.

50. The method of claim 49 wherein the network address is a dynamic IP address obtained from a DHCP server.

51. The method of claim 48 further comprising

gathering network topology information characterizing the topology of the network to which the network device is attached; and

providing the network topology information to the remote device; and wherein the configuration information received from the remote device is based on the hardware profile and the network topology information.

52. The method of claim 51 wherein the network topology information comprises information concerning at least one host neighboring the network device.

53. The method of claim 51 wherein the network topology information comprises the subnetworks accessible to the network device.

54. The method of claim 48 wherein the establishing step is performed in response to the receipt of a configuration message transmitted by the remote device.

55. The method of claim 54 wherein the configuration message is addressed to the broadcast address of the network.

56. The method of claim 50 wherein the network comprises a DHCP server operative to provide the network address of the remote device in a field associated with a DHCP response transmitted to the network device.

57. The method of claim 48 wherein a second network device connected to the network is operative to broadcast the network address of the remote device.

58. The method of claim 48 wherein the network comprises a second network device operative to transmit the network address of the remote device in response to a request; and wherein the method further comprises
broadcasting a request for the network address of the remote device.